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I. Clinical Aspects of Canine Leptospirosis *

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This article is contributed with the intention of awakening, or reviving, interest in canine leptospiral infection in this country. There is little literature available to the practitioner on the subject, which receives scant attention in English text-books. Some knowledge of the disease would appear to be desirable from the public health viewpoint, as well as for the prevention and treatment of the disease in dogs. A discussion of the clinical research begun at Liverpool is added because the results appear to confirm the supposition that leptospiral infection in this country is less rare than is supposed, and that the same main disease syndromes occur here as have been described abroad.

PART I: REVIEW OF THE LITERATURE

The significance of leptospirosis has been noted only recently. In 1913 the Japanese workers Inada and Ida discovered *Spirochaeta icterohaemorrhagica* (later known as *Leptospira icterohaemorrhagiae*) to be the specific cause of Weil's disease in man. This was followed, in 1916, by the first report which suggested that the same organism might be of significance in the dog, when Krumbein & Frieling (1916) reported a case of jaundice in a dog which was followed by Weil's disease in two people in contact with the animal.

THE DISEASE IN MAN.—Since the work of Inada and Ida investigations in various countries have shown that human leptospirosis occurs most often as a result of infection from rats. Leptospirae when voided in the urine of carrier rats enter the body by penetration of the nasal or buccal mucous membrane, or through skin wounds, or they may penetrate the intact skin. Infection occurs commonly as a result of bathing in water contaminated by rats, or may be the result of occupational hazard. Cases reported in England are mainly restricted to persons whose employment brings them in contact with rats, *e.g.*, miners, fish workers, sewer workers. It is of interest, however, to note that in Holland, where awareness of the disease among the medical profession resulted in a marked increase in reported cases between the years 1928–38, only 22 per cent. of reported cases are occupational in origin (Walch-Sordrager, 1939).

Investigations on the incidence of leptospirosis in rats in Britain are summarised by Allcroft (1945). In investigations conducted before 1927, the proportion of rats tested which were found to be excreting leptospirae was relatively small, but in the remaining ten years covered by the summary the average incidence, in the 676 rats examined in five different districts, was 37·6 per cent. Mason (1938) demonstrated the presence of immune bodies against *L. icterohaemorrhagiae* in the sera of nine of eleven rat catchers tested; none of these men had any recollection of being jaundiced. It therefore seems probable that Weil's disease is more common in this country than is generally supposed, particularly as icterus which is regarded as the cardinal symptom, is not present in all cases.

THE DISEASE IN DOGS.—The first record of leptospirosis in the dog was by Okell, Dalling & Pugh (1925). They reported ten cases of jaundice and/or an acute haemorrhagic type of infection in which leptospira were implicated. Three of these were established as *L. icterohaemorrhagiae* infections. Three others, in which the reactions of the guinea-pigs inoculated with infective material were atypical, may well have been due to *L. canicola*. Investigations into the disease in dogs became complicated in 1933 by the discovery by Klarenbeek & Schüffner in Holland of a strain of leptospira which, while identical with *Leptospira icterohaemorrhagiae* morphologically, was serologically distinct and also differed in that it was only feebly pathogenic for guinea-pigs and was not found to occur in rats. This strain became known as *Leptospira canicola*. Whilst canine infection with *L. icterohaemorrhagiae* presumably occurs along the same general lines as in man, *L. canicola* infection occurs from dog to dog, the infecting organism being excreted in the urine.

Stuart (1946) has shown *L. canicola* infection to occur commonly in house dogs in Glasgow. He tested the sera of 100 dogs, taken at the time of destruction for reasons not stated, against *Leptospira canicola* antigen and found that 40 per cent. agglutinated at a titre of 1 : 30 or higher, which was taken to indicate infection at some time during life. Joshua & Freak (1947) have recorded the results of treatment of six cases, diagnosed by the agglutination test as *L. canicola* infection. These appear to be the only records of original work in Great Britain.

There is a tendency in this country to regard leptospiral infection as being restricted to young dogs in kennels, particularly those of sporting breeds, or to dogs known to be ratters. While this may be true, up to a point, of the epidemiology of *L. icterohaemorrhagiae* it cannot apply to *L. canicola* infections; and cases certainly occur, and will later be discussed, in which animals affected with the classical strain fall into none of these categories. Wirth (1939) stated that infected dogs in Germany often have a history of swimming in, or drinking from stagnant river-pools or ponds.

Occurrence Abroad.—Walch-Sordrager (1939) summarised the results of all agglutination tests carried out on dogs up to that date, and put the percentage of positive reactions at between 4 and 15 (1:100 or above was taken as a positive titre).

Predominant Strain.—The ratio of *L. canicola* to *L. icterohaemorrhagiae* infection varies. In Europe both Klarenbeek (1938) in Holland, and Uhlenhuth & Zimmermann (1936) in Germany, give a ratio of roughly 2 : 1. In San Francisco, Meyer, Stewart-Anderson & Eddie (1939) found a ratio of 11 : 1, and Raven & Barnes (1940) showed that in Pennsylvania the ratio of *L. canicola* to *L. icterohaemorrhagiae* was 3 : 1. Thus *L. canicola* appears to be more common in all the countries in which the matter has been investigated.

Importance from the Public Health Aspect.—Four cases are on record of the transmission of *L. icterohaemorrhagiae* from infected dogs to man. Human infections with *L. canicola* reported up to 1943 (Lovell, 1943) numbered 22; they were noted in Holland, Austria, Denmark and California. The actual frequency of the disease is unknown. In the twelve cases described by Walch-Sordrager (1939) severe symptoms did not always occur and jaundice was rare. Meningitis, however, occurred with relative frequency. Cases also occurred which were characterised by a mild influenza-like illness and were undiagnosed at the time. Later when attention was drawn to them as a result of investigation of a positive case in the same household, their serum gave a high titre with *L. canicola* antigen. All cases were in contact with dogs which showed a high agglutination titre. In two cases leptospirae were cultivated from the urine of both dogs and owners and identified as *L. canicola*. Wirth (1939) recorded the persistence of leptospirae in the urine of a dog for six and a half months after infection, and Walch-Sordrager (1938) found them in some cases up to four months after infection. These reports suggest that an infected dog may be a source of either type of infection for some time after its clinical recovery.

SUMMARY OF SYMPTOMATOLOGY

The outstanding feature of leptospiral infection in the dog is the diversity of its symptomatology and this partly accounts for the difficulty in arriving at a diagnosis. The disease picture also tends to be obscured by confusion of nomenclature. Wirth (1939) states that infection may result in the following clinical syndromes:—

(1) Acute jaundice.

(2) Acute uraemia.

(3) Chronic uraemia.

(4) Polyuria.

(5) Leptospiruria with no symptoms, which may disappear or later flare up into type (2) or (3). He regards the syndrome which he formerly called "Stuttgart disease" as being attributable to acute uraemia and being identical with type (2). Okell, Dalling & Pugh (1925) describe two distinct syndromes—an acute harmorrhagic and an icteric type of infection. Joshua & Freak (1947) record cases of acute nephritis the sera of which gave high agglutination titres against *L. canicola* antigen. Meyer *et al.* (1939) describe icteric and

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haemorrhagic types. They describe the so-called haemorrhagic type as resembling "Stuttgart disease," but do not attribute the symptoms to uraemia or mention kidney damage beyond "a parenchymatous inflammation indicative of an acute febrile process." Bloom (1937), however, regards the "Stuttgart" syndrome (as it occurs in leptospirosis) as a uraemia of renal origin and also describes extensive kidney damage in uraemic cases (1941).

It therefore appears that in relation to leptospiral infections "haemorrhagic type," "Stuttgart disease," and "uraemia" should be regarded as identical and attributed to kidney damage.

Clinical Picture in Relation to Strain of Leptospira.—Wirth (1939) advises that, in general, cases of uraemia should be attributed to *L. canicola* and icteric cases to *L. icterohaemorrhagiae* in absence of evidence to the contrary, but points out that the syndromes may overlap. Klarenbeek (1938) found that dogs infected with *L. icterohaemorrhagiae* were usually icteric, and that in many cases uraemia was an additional symptom but in some cases uraemia alone occurred. In *L. canicola* infections icterus was uncommon but occurred occasionally, uraemia was frequent but half the cases were neither uraemic nor icteric and showed a diversity of symptoms possibly falling into the last two groups of Wirth's classification.

It therefore appears to be possible for both strains of the organism to cause either of the main types of disease—icteric or uraemic—although icterus is uncommon in *L. canicola* infections.

Diagnosis

One of the reasons why leptospirosis has attracted less attention than it merits is the difficulty of making a certain diagnosis. This is particularly true of *L. canicola* infection.

At *post-mortem* examination a diagnosis of *L. icterohaemorrhagiae* infection may be made by inoculation of guinea-pigs with infective material. Mason (1938), however, showed that in many cases guinea-pigs which were inoculated with leptospirae from rats did not succumb. Even this doubtful method of diagnosis is not available in the case of *L. canicola* infections, as guinea-pigs in common with most laboratory animals are not susceptible. Hamsters appear to be the test animal of choice in this case for Larson (1944) has shown that inoculation of *L. canicola* causes haemorrhages and death in hamsters.

In both types of infection the organisms may be recognised in sections of the organs stained by Levaditi's method. A definite negative finding based on evidence of this sort would necessitate the examination of a large number of stained sections of several types of tissue. The appearance of artefacts is a further difficulty. Tissue scrapings may reveal the organism by the dark ground illumination technique—Bloom (1941) and Meyer *et al.* (1939) based their positive findings on this method. Other laboratory methods appear to be outside the scope of those dealing with routine investigations only. From the point of view of the clinician positive diagnosis in life is essential. Urine examination is the routine method of diagnosis in the human subject. Dark ground microscopical examinations, however, require special equipment and some acquaintance with the technique is necessary before leptospirae in urine can be recognised with assurance. A further difficulty for the veterinary surgeon lies in the fact that the dog's urine is normally acid in reaction, and leptospirae tend to disintegrate in an acid medium, so that even if the organisms were still present when the urine was voided it is unlikely that they would be visible when the urine was examined at a laboratory unless the *p*H had been suitably adjusted. The difficulty in obtaining urine from canine patients must also be borne in mind, particularly if, as is usual in leptospirosis, oliguria is a symptom. Bloom (1941) and Meyer *et al.* (1939) consider that these difficulties make the use of this method of diagnosis impracticable. Presumptive evidence of infection is provided by the agglutination-lysis test, agglutination being demonstrated by the dark ground microscopic technique. This test is a complicated procedure and few laboratories in this country are prepared to carry it out. In America a macroscopic modification of this test is in use by practitioners, but it is regarded as unreliable (Coffin, 1945).

For the moment, it appears that, in this country, the clinician must diagnose leptospirosis from clinical symptoms alone, and it is with this in mind that the clinical data in part II of this paper are published.

Treatments of Possible Value

Specific treatment for leptospirosis may be of two types:—

(1) Biological;

(2) Chemotherapeutical.

(1) Biological.—Opinions vary as to the value of serum therapy. Difficulty in assessing its usefulness is due partly to variations in the protective quality of the sera used, and also to variations which occur in the course of the disease when untreated. Walch-Sordrager (1939) concludes from the evidence available that although no specific action on the organism is demonstrated, antiserum appears to have a beneficial effect when administered within four days of the onset of symptoms. A serum of high agglutinating and lytic titre for both strains or for the strain incriminated should be used and large doses given.

(2) Chemotherapeutical. (*a*) *Bismuth.*—Parenteral administration of bismuth preparations has been used with success in spirochaetal infections. Sazerac *et al.* (1927) and Uhlenhuth & Seiffert (1929) found sodium bismuth tartrate beneficial in artificial infections of *L. icterohaemorrhagiae* in guinea-pigs. Arsenic and antimony appeared to have no effect on the course of the disease.

(*b*) *Penicillin.*—Alston & Brown (1944) found both *L. icterohaemorrhagiae* and *L. canicola* to be sensitive to penicillin which was inhibitory and lethal to the organisms *in vitro* and curative for the disease in guinea-pigs if treatment was begun soon after infection. Cross (1945) found penicillin to be more effective than large quantities of serum in treating a human case of *L. icterohaemorrhagiae* infection. Larson & Griffiths (1943), however, found no important difference in the therapeutic effects of serum and penicillin on *L. icterohaemorrhagie* and *L. canicola* infections in guinea-pigs and hamsters respectively. These workers also found that both serum and penicillin were ineffective in influencing the course of the disease in these animals if treatment was withheld until after the appearance of jaundice. Joshua & Freak (1947) treated six dogs showing suspicious symptoms and whose sera agglutinated *L. canicola* antigen, with penicillin. All recovered except one. Relapses occurred in two cases, but these dogs recovered when penicillin therapy was reinstituted.

PART II: PERSONAL INVESTIGATION

This investigation commenced in March and ended, for the purposes of this paper, in December, 1947. Confirmation of clinical diagnosis in life was by agglutination-lysis test on the sera. The Schüffner test was used and the sera tested at various dilutions against *Leptospira icterohaemorrhagiae* and *Leptospira canicola* antigen. This test was carried out by Dr. R. D. Stuart, of Glasgow. Gross and microscopic *post-mortem* examinations were carried out in all cases where this was possible. This part of the investigation was undertaken by Mr. A. R. Jennings, of the University Department of Veterinary Pathology, and is reported by him. In the latter half of the investigation, when the writer became more familiar with the main syndromes, it was found to be possible to use clinical symptoms as a basis for diagnosis and thus to institute specific treatment before confirmation by the Schüffner test was available. This is illustrated by the fact that, in all, 30 dogs were suspected and their sera submitted for test. Of the first 15 only two gave a reaction which was taken to indicate a current or recent infection, while amongst the last 15 nine gave a reaction of this type. Agglutination tests were also performed on the sera of eleven clinically normal dogs. The results of this test are summarised for purposes of comparison.

Interpretation of the Results of the Schüffner Test

Acting on the advice of Dr. Stuart, two or more serum samples were taken from suspected dogs, whenever possible, with a minimum of four days between tests. The reason for this procedure was that while agglutination at a high titre is good evidence of recent infection, it is impossible to say, unless a subsequent test is performed, whether a reaction in the lower dilutions represents the rising titre of an early acute infection or the gradually falling titre of an infection which may have taken place months, or even years, before. It was unfortunately impossible to follow up the first serum test in all cases, usually due to the owner's request to have the dog destroyed immediately; but those cases which showed a very high agglutination titre and which had been ill for some days—strongly suggesting that titre and symptoms were correlated—have been classed as "Recent Infections." One blood sample only was taken from the clinically normal group.

On a basis of the type of serological reaction the positive reactors are divided as follows:—

Group I (*a*) *Current Infections* (*Acute Clinical Symptoms*).—Seven dogs were in this group. Their bloods were all subjected to test early in infection, and all showed a rise in titre at a subsequent test (see Table).

Group 1(a) Current Infections—Acute Clinical Symptoms

Case No.	Age	Organism	1st Test Titre	1st Test N.P.N.	Days between tests	2nd Test Titre	2nd Test N.P.N.	Days between tests	3rd Test Titre	3rd Test N.P.N.	Days between tests	4th Test Titre	Penicillin treatment	Outcome
5	13 mths.	*L. icterohaemorrhagiae* *L. canicola*	1 : 10 —	53 mg.	5	1 : 300 —		14	1 : 300 —		112	1 : 100 —	—	Complete clinical recovery
19	19 mths.	*L. icterohaemorrhagiae* *L. canicola*	1 : 1,000 1 : 10,000	102 mg.	5	1 : 1,000 1 : 30,000							—	Destroyed
23	3 yrs.	*L. icterohaemorrhagiae* *L. canicola*	1 : 1,000 1 : 10,000	98 mg.	10	1 : 1,000 1 : 10,000	86 mg.	28	1 : 1,000 1 : 30,000	64 mg.			+	Clinical chronic nephritis
25	10 mths.	*L. icterohaemorrhagiae* *L. canicola*	1 : 100 1 : 1,000	87 mg.	5	1 : 300 1 : 3,000	77 mg.						—	Complete clinical recovery
26	2½ yrs.	*L. icterohaemorrhagiae* *L. canicola*	1 : 3,000 to 1 : 10,000 —	82 mg.	7	1 : 30,000 1 : 30	36 mg.						+	Complete clinical recovery
28	3 yrs.	*L. icterohaemorrhagiae* *L. canicola*	1 : 30 —	228 mg.	4	1 : 100* 1 : 10							+	Died
30	9 mths.	*L. icterohaemorrhagiae* *L. canicola*	1 : 1,000 1 : 3,000	35 mg.	5	1 : 30,000 1 : 30,000	38 mg.						+	Complete clinical recovery

* The titre given for this blood sample is only approximate as it was taken after death and was badly contaminated.
N.P.N. = non-protein nitrogen of blood in milligrammes per 100 c.c.
Penicillin treatment as described in text.

Group I (*b*) contains one case only. This was clinically an acute case presented early in infection but its serological behaviour prevents it from being classed with other acute cases in Group I (*a*).

Case No.	Age	Organism	1st Test Titre	1st Test N.P.N.	Days between tests	2nd Test Titre	2nd Test N.P.N.	Days between tests	3rd Test Titre	3rd Test N.P.N.	Penicillin	Outcome
24	19 mths.	*L. icterohaemorrhagiae* *L. canicola*	1 : 1,000 1 : 3,000	226 mg.	5	1 : 300 1 : 3,000	89 mg.	21	1 : 30 1 : 1,000	44 mg.	+	Complete clinical recovery

The only explanation which can be offered for the fall in titre is that it was connected with the response to penicillin therapy. This response was demonstrated by clinical improvement and by the rapid fall in blood non-protein nitrogen.

Group II. Recent Infection (*Subacute Clinical Type*).—The three sera in this group showed a reaction at high dilutions—over 1 : 30,000 for the incriminated strain. All the dogs had been ill for a fortnight or longer before blood was taken and all were destroyed as hopeless.

figures, 208, 206, and 150 mg. respectively. Three of the cases came to *post-mortem* examination and showed a degree of interstitial fibrosis of the kidney, which was surprising in view of the fact that one had been noticed to be ill for a fortnight and the others for two days only. It is probable, however, that the owners had not noticed the typical earlier symptoms of excessive thirst and polyuria. The individual reactions in Group III are not quoted as this seems to serve no useful purpose. They ranged between 1 : 100 and 1 : 300, when *L. canicola* was presumed to have been the source of infection. The reaction which was attributed to *L. icterohaemorrhagiae* infection was 1 : 100 for the incriminated strain. Leptospiral infection may or may not be of significance as a cause of the original tissue damage which resulted in fibrosis.

Case No.	Age	Organism	1st Test Titre	1st Test N.P.N.	Days between tests	2nd Test Titre	Penicillin	Outcome
10	1 year	*L. icterohaemorrhagiae* *L. canicola*	1 : 3,000 1 : 100	106 mg.			—	Destroyed
17	9 months	*L. icterohaemorrhagiae* *L. canicola*	1 : 300 1 : 100,000	46 mg.			—	Destroyed
18	5 years	*L. icterohaemorrhagiae* *L. canicola*	— 1 : 30,000	124 mg.	5	1 : 100 1 : 30,000	+	Destroyed

Group III.—Eight cases which showed positive reactions but which could not be classified in Groups I or II. No titres above 1 : 300 for the incriminated strain are included in this group.

Group III (*a*).—Three cases. All showed a low titre, and subsequent tests in two of the cases revealed no rise in titre. Symptomatically they were mild febrile cases without significant rise in non-protein nitrogen blood levels. It is likely that the reaction to the test in low dilutions was due to a previous mild leptospiral infection which had no relation to the symptoms shown when the blood was taken.

Group III (*b*).—The other five cases in Group III also showed low titres. All the dogs died or were destroyed before a second blood sample could be taken. They appeared to be in the end stage of a typical chronic nephritis. Owing to the moribund state of the animals it was possible to take sufficient blood for a non-protein nitrogen estimation from only three of them. All showed high

Results of Agglutination Tests on the Sera of Clinically Healthy Dogs

Eleven normal dogs were used. Their ages ranged between seven months and twelve years. Three of the dogs were females and eight males. Their appearance was normal and they were reported to be in normal health. Particular care was taken to avoid taking blood from dogs with any history suggestive of chronic nephritis.

Six of the eleven sera gave a completely negative result. Three gave a positive reaction against *L. canicola* antigen at a titre of 1 : 300 or less and a paraspecific reaction with *L. icterohaemorrhagiae* antigen. One gave a reaction of 1 : 30 with *L. icterohaemorrhagiae* antigen without a paraspecific reaction. In view of the normal condition of the dogs it is probable that these titres represented old infections, cf. Group III. The remaining blood serum gave a reaction of 1 : 1,000 with *L. canicola* antigen and no paraspecific reaction. This suggests a recent infection but there was no history of recent illness.

Wirth (1939) also describes the occurrence of symptomless leptospiruria.

Causal Strain.—The phenomenon known as paraspecific reaction has been noted by all workers on agglutination tests for leptospirosis. It consists of a reaction at lower serum dilutions with the antigen of the related organism as well as high titres for the infecting organism. Walch-Sordrager (1939) noted that a paraspecific reaction occurs more often and at higher dilutions in *L. canicola* than in *L. icterohaemorrhagiae* infections. The same phenomenon will be noticed to occur in the results recorded above. It has been proved in the past that the two strains are distinct entities by the occurrence of cases of both types in which there are no paraspecific reactions. This occurred in number 5 and in the first sera taken from cases 18 and 28 of this series. The organism which gave the highest serum agglutinating titre in each case has been taken to be the infecting one. Thus in Groups I and II there were seven *L. canicola* and four *L. icterohaemorrhagiae* infections. In Group III (a) there were two *L. canicola* and one *L. icterohaemorrhagiae* infections. In Group III (b) all five cases were taken to be *L. canicola* infections. One case is of doubtful origin as it showed a titre of 1 : 100 for both strains ; but as paraspecific reactions are more common in *L. canicola* infections the reaction was attributed to infection by that strain. The following possibilities should be borne in mind when interpreting low titres of the kind found in Group III : (*a*) The symptoms may be unrelated to leptospiral infection and the titre may represent an old mild infection. (*b*) The symptoms may be the cumulative result of a long-standing chronic nephritis and the titre may or may not be associated with the cause of the kidney damage. (*c*) The disease may be hyperacute and kill the animal or necessitate its destruction before a high titre has had time to develop, as agglutinins take from seven to ten days to develop. (*d*) A low titre may represent a paraspecific reaction which is occurring due to infection with a strain of leptospira not used in the test. Gardner (1943) used strain McIntyre, which was isolated from an infection which occurred in an English veterinary surgeon, in serological tests on dogs showing symptoms suspicious of leptospirosis, and recorded that it caused agglutination at a higher titre than did either *L. icterohaemorrhagiae* or *L. canicola* antigen.

From the evidence available in this investigation it may be stated that of the 30 animals tested, 19 showed a titre indicating infection at some time during life. In five of these infection was presumed on available evidence to be due to *L. icterohaemorrhagiae* and in 14 to *L. canicola* infection. The ratio of the two infections in this series is comparable to that reported elsewhere in Europe (see Part I).

Effect of Penicillin on Agglutination Titres.—Where treatment with penicillin was given it is recorded in the tables. In no case was treatment continued after the eighth day. It must be accepted as a possibility that therapy will affect the response to the agglutination test. A fall in agglutination titre occurs, for instance, in the successful treatment of human spirochaetal infections. Alston & Brown (1944), however, showed that successful treatment of experimental *L. icterohaemorrhagiae* infections in guinea-pigs did not appear to influence the titres.

A study of the tables will show that, in those *L. icterohaemorrhagiae* infections which were treated, the titres continued to rise while the dogs were receiving penicillin (cases 26 and 28), and that the titres in three of the *L. canicola* infections fell or remained static while penicillin was being given (cases 18, 23 and 24). In case 23 the titre had risen when a third blood sample was taken a month after treatment had been discontinued. One case of *L. canicola* infection (case 30) showed a rise in serum titre while penicillin was being given, but treatment in this case lasted three days only and five days elapsed between the tests. The number of cases is too few to draw any definite conclusions regarding the effect of penicillin on the agglutination titres in dogs.

DISCUSSION OF GROUPS I AND II (ACUTE AND SUBACUTE CLINICAL CASES)

Other Aids to Diagnosis Used

1. *Biochemical Tests on Blood.*—These were carried out by Mr. W. F. L. Whiting, of the Department of Biochemistry of the University.

(*a*) *Non-protein Nitrogen Estimation.*—50 to 60 per cent. of blood non-protein nitrogen is represented by urea (Bodansky, 1939). Thus the amount of non-protein nitrogen in the blood is influenced by the capacity of the kidneys to eliminate urea. The test was therefore used as an index of the efficiency of kidney function. The test also gave valuable assistance in prognosis as the seriousness of the disease appeared to be roughly proportional to the rise in the level of non-protein nitrogen. This test was used in preference to a blood urea test as smaller quantities of blood are necessary for the former.

Coffin (1945) quotes 17 to 38 mg. per 100 c.c. as being the normal blood value for the dog. Eight of the eleven cases in Groups I and II showed a significant increase in non-protein nitrogen, figures varying between 82 mg. per cent. and 228 mg. per cent. Two other cases showed a quantity above normal—46 and 53 mg. per cent. respectively—but in view of the fact that slight increases in non-protein nitrogen blood values may occur in febrile conditions (Bodansky, 1939) these figures were not taken as being necessarily related to loss of kidney function. One case (30) showed a blood non-protein nitrogen within the normal range. It is of interest to note that two of the "uraemic" animals (cases 26 and 28) also showed very marked jaundice. Liver damage is not quoted as a cause of raised blood non-protein nitrogen and it was concluded that in these cases both liver and kidney were affected. This was shown to be true of case 28 on which a *post-mortem* examination was performed.

Kidney damage or dysfunction (as demonstrated by a marked rise in non-protein nitrogen blood values) occurred in five out of seven cases attributed to current or recent infection with *L. canicola*, and in three out of four cases attributed to acute or subacute *L. icterohaemorrhagiae* infection.

(*b*) *Van den Bergh Reaction.*—This test was carried out on the sera of the two cases which showed clinical jaundice. Both were *L. icterohaemorrhagiae* infections and both gave positive direct and indirect Van den Bergh reactions indicating that the pigment in the serum was both pre- and post-hepatic in origin. Coffin (1943) attributes the icterus which occurs in leptospirosis both to liver damage with consequent obstruction of the bile canaliculi, and to haemolysis. It should be noted that clinical jaundice occurred in only two of the four acute infections attributed to *L. icterohaemorrhagiae*, and that none of the cases attributed to infection with *L. canicola* showed jaundice.

2. *Urine Tests.*—Whenever possible, urine was collected and tested for albumin. As oliguria was a feature of most cases this was difficult, but urine was obtained from seven of the eleven acute and subacute cases. Six of these specimens gave positive reactions for albumin. The urine negative for albumin was that of case 17 (blood non-protein nitrogen 46 mg. per cent. only).

3. *Guinea-Pig Inoculations.*—Inoculation of guinea-pigs with a suspension of liver and kidney pulp was carried out in two cases —No. 28, Group I—No. 18, Group II. Two white guinea-pigs were inoculated intraperitoneally in each case. None of the guinea-pigs showed anything characteristic of a leptospiral infection.

4. *Post-mortem Findings.*—*Post-mortem* examinations were carried out on cases 19, 28, 10 and 18. The gross and microscopic findings are reported by Mr. Jennings.

Epidemiology of Acute and Subacute Cases

Age.—All the cases of current or recent infection were in young dogs. Of the eleven cases, seven were under two years old, three of the remainder were between two and four, and one was five. This is in keeping with the finding of Klarenbeek (1938) that 45 per cent. of *L. icterohaemorrhagiae* infections were in dogs under two years, and 63 per cent. of *L. canicola* infections were in dogs under three years ; but not with those of Meyer *et al.* (1939) who found older dogs to be more commonly affected.

Sex.—Ten of the eleven cases recorded occurred in males. All authorities agree that male dogs are more often affected than females with either strain of the organism. It is suggested by Wirth (1939) that in the case of *L. canicola* infections this may be due to the habit (more common in the male) of sniffing at urine and at the genital organs of other dogs. Several authorities regard the common condition of chronic contracted kidneys in the dog as having its origin in an attack of leptospirosis which causes the primary inflammatory changes. The more frequent occurrence of chronic nephritis in male dogs is suggestive, and it is of interest that case 23, having recovered from the symptoms of acute uraemia, subsequently became a typical chronic nephritis with polyuria, thirst and albuminuria.

Possible Sources of Infection.—Of the four cases of *L. icterohaemorrhagiae* infection there was a definite history of ratting in only one ; in two others there was a history of the appearance of rats in the vicinity. Mason (1940) found that Leptospirosis is common among rats in Liverpool—33 per cent. of those caught in all districts were found to be eliminating leptospira in their urine. In the fourth case there was no evidence to show how the infection was acquired. All dogs affected with *L. canicola* infection had unrestricted contacts with other dogs.

Diagnosis of Acute and Subacute Leptospiral Infections (Groups I and II) by Clinical Symptoms and Histories

A general clinical picture of the acute and subacute disease only will be given. A detailed analysis of the cases would serve no useful purpose as diversity of symptoms is outstanding in this disease and a symptom which would be thought typical by one clinician might be passed over by another.

Uraemic Symptoms Predominant. (Eight cases—five *L. canicola* and three *L. icterohaemorrhagiae* infections.)—Six were acute (Group I) and two were subacute (Group II). Although uraemic symptoms were predominant the *post-mortem* findings showed that all dogs of this group which were autopsied had also suffered liver damage although only one of them showed jaundice.

Acute Uraemia. (Four were due to *L. canicola* and two to *L. icterohaemorrhagiae.*)—This type of case is of sudden onset. There is marked mental and physical depression and complete anorexia is usual. Water is also refused in many cases. Defaecation is in abeyance and the rectum is generally empty. Vomiting is a regular symptom, and usually occurs two or three times daily. The quantity of urine voided is unusually small. The symptoms in the very early stages are typically those of any acute febrile disease—an elevated temperature, staring coat, constipation, thirst, etc. The temperature in most cases has fallen to normal or subnormal by the second or third day of illness In one case, however, the temperature fluctuated throughout the illness between 101° and 103° F. The commonest symptoms in this second stage are a uraemic odour of the breath, unhealthy appearance of the buccal mucous membrane and muscular pain—especially in gluteal muscles—with a disinclination to move. The kidneys are painful on palpation. In the two cases which were jaundiced, excessive salivation was also noted.

Subacute Uraemia. (Two cases—one each of *L. canicola* and *L. icterohaemorrhagiae.*)—Both these animals had been ill for several weeks with symptoms of depression, loss of appetite, and occasional vomiting. Their condition had gradually deteriorated. The signs of uraemia were similar to those exhibited in the acute type but were more marked. Uraemic odour from the mouth, unhealthy appearance of the mucous membrane (which had progressed in one case to ulcers against the upper canine teeth), coating of the teeth, and vomiting were prominent. Diarrhoea with the passing of dark tarry faeces occurred in one case. Extreme depression and weakness were prominent in both cases. Temperatures were within the normal range.

Mild Case. (*L. icterohaemorrhagiae* infection.)—Case 5 was a very mild one. The symptoms were reduced appetite, diarrhoea, loss of flesh and an elevated temperature. Symptoms lasted for about ten days and recovery was spontaneous.

Unclassified Cases. (*L. canicola* infection.)—Cases 17 and 30 showed marked depression, anorexia and occasional vomiting, symptoms indistinguishable from those of uraemia. The non-protein nitrogen level of the blood, however, showed no significant increase. There were no clinical signs of jaundice. In case 17 an intestinal obstruction was at first suspected. Laparotomy revealed enlargement of the liver and congestion of the intestines. The animal was eventually destroyed but was unfortunately not made available for *post-mortem* examination. Case 30 was treated with penicillin and made a complete clinical recovery.

Differential Diagnosis

In early acute cases, and in mild cases, it is probably impossible to differentiate the symptoms with any certainty from those of Distemper. Lack of respiratory symptoms and usually of diarrhoea, the presence of pain over the kidneys and muscular stiffness, and the subsequent fall in the temperature which will remain normal or subnormal, may be helpful pointers in recognising an early leptospiral infection. An established acute or subacute case has many symptoms in common with Obstruction of the Small Intestine which is also a cause of a rise in the blood non-protein nitrogen. Radiographs were taken of two of the subacute cases with a differential diagnosis of this kind in view. Large accumulations of gas in the small intestines were noted in both cases. Wirth (1939) also mentions abnormal appearances on radiographs of suspected animals. This appearance was so marked that in the first case a laparotomy was performed on the assumption that a non-opaque foreign body or some other obstruction would be found. Palpation of the abdomen of the dog while under a general anaesthetic is probably the best differential method available.

Black Tongue (nicotinic acid deficiency) is usually given in the differential diagnosis of leptospirosis. The writer has never seen a naturally occurring case of nicotinic acid deficiency in the dog and is of the opinion that many cases designated as black tongue are leptospiral in origin.

The End Stage of Chronic Nephritis is indistinguishable from acute or subacute leptospiral uraemia on clinical symptoms alone. The advanced age of the typical chronic nephritis case and a history of polyuria, excessive water drinking, and occasional vomiting, for some time past, might be helpful.

Prognosis and Indications for Treatment

Prognosis must be based mainly on the duration of illness, the degree of depression, and non-protein nitrogen blood values (see table).

In Group I, cases 5, 25 and 19 received no specific treatment. Case 5 was mild and the increase in non-protein nitrogen negligible. Clinical recovery was complete. Case 25 showed a fairly high blood non-protein nitrogen figure but little depression. Treatment was withheld for a time. This decision was justified by a marked improvement which occurred during the next five days and the dog was later reported to have made a complete clinical recovery. Specific treatment was withheld in case 19 to await definite diagnosis by the Schüffner test. When this was available the dog was too ill to merit treatment. Six cases (18, 23, 24, 26, 28 and 30) were treated with penicillin immediately on presentation, a diagnosis being made on clinical symptoms and the evidence of the rise in non-protein nitrogen level which occurred in all except case 30. All the dogs showed extreme depression. Cases 26 and 28 were also icteric. The prognosis was poor to fair—varying with the non-protein nitrogen values—in all these cases.

Treatment and Progress

Treatment consisted of immediate administration of 20,000 units of penicillin in aqueous solution, plus 125,000 to 250,000 units (according to the size of the dog) of penicillin in oil. The dose of penicillin in oil was repeated daily until a marked clinical improvement was noted.

Cases 18 and 28 did not respond to treatment; case 23 appeared to pass out of the acute stage into a typical chronic nephritis; cases 26, 24 and 30 recovered. The blood non-protein nitrogen level was noticed to fall as improvement progressed in those cases with a favourable outcome (see tables). No relapses occurred. High protein value foods were withheld in all cases and vomiting was treated symptomatically.

Summary

Part I of this article consists of a review of the important literature on canine leptospirosis. The suggestion is put forward that the disease attracts less attention than it merits in this country.

Part II describes an investigation which was carried out on 30 suspected cases. Diagnosis was by the Schüffner agglutination-lysis test on blood serum. The results are discussed and a record of agglutination reactions of the sera of eleven clinically normal dogs is added for comparative purposes. Nineteen of the suspected animals showed a positive reaction to the test. Of these, 14 were presumed to be due to infection at some time during life with *Leptospira canicola*, and five to *Leptospira icterohaemorrhagiae* infection.

Eleven of the 19 cases were classed as acute or subacute. The remaining eight cases were taken to be the residual titres of old infections. Six of the acute or subacute cases showed predominant uraemic symptoms (five due to *L. canicola* and one due to *L. icterohaemorrhagiae* infection). Two were both uraemic and icteric (both *L. icterohaemorrhagiae* infections). One was mild and febrile in type (*L. icterohaemorrhagiae* infection), and two were unclassified (*L. canicola* infections).

The usefulness of the non-protein nitrogen level of the blood as an index of kidney damage and as a prognostic aid before and during treatment is noted.

Clinical symptoms and differential diagnosis in acute and subacute cases is discussed. Treatment with penicillin in five of these cases is recorded.

Acknowledgments.—The review of leptospirosis by Walch-Sordrager (1939) in the Bulletin of Health of the League of Nations has been used extensively in preparing the first part of this paper, and where recourse to the original reference has not been made this is mentioned in the bibliography. I should like to thank Mr. M. D. Hill, of Ledbury, for translations from German periodicals which were also most useful in preparing the review of the literature.

Acknowledgments are due to Professor J. G. Wright for making facilities available for the investigation and also for his useful comments on the text of the report. Dr. R. D. Stuart, of the Public Health Laboratory, Glasgow, kindly performed the agglutination-lysis tests which form the basis of the report and without which the investigation could not have been carried out. He also gave advice on the interpretation of the test. My thanks are also due to Mr. A. R. Jennings, of the Veterinary Pathology Department of the University, for his co-operation in performing and reporting upon the *post-mortem* examinations, to Mr. W. F. L. Whiting, of the Biochemistry Department for performing the biochemical tests on blood, and to the professional and technical staff of the Veterinary Hospital and Veterinary Pathology Department for their assistance and encouragement.

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II. Post-mortem Findings in Leptospiral Infections in the Dog

By

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The *post-mortem* examinations recorded here were undertaken at the request of Miss Mills. The clinical aspects of these cases are described in the preceding paper.

Case No. 19

SUBJECT. Brown and white dog, aged 19 months.

General bodily condition was good. There were no external abnormalities. The mouth and pharynx showed no gross changes.

THORACIC CAVITY.—The lungs showed some slight emphysema at the apices of the lobes. The adjacent lymph nodes appeared to be normal. The heart was large and very flabby.

ABDOMINAL CAVITY.—The stomach was acutely inflamed with ulceration and haemorrhage in the fundus. Throughout the intestines was a varying degree of enteritis; the duodenum was most severely affected and here the inflammation was haemorrhagic. The lumen contained blood and mucus. The ileo-colic lymph node was soft and oedematous. The spleen was deep purple in colour and very congested. The liver was also congested and showed four circular areas of necrosis. These necrotic areas were superficial, very shallow and about 1 in. in diameter. There was no evidence of biliary obstruction.

The kidneys were small and contracted. The capsule was adherent and was stripped with difficulty. The cortex was roughened and granular and had a mottled appearance. Whitish streaks could be seen extending into the medulla. The latter was congested and stood out in contrast to the cortex. The ureters were normal as was the bladder. On examination urine from the bladder was seen to contain albumin and granular casts. Dark ground examination of centrifuged urine deposit did not reveal any leptospirae. The urine gave an acid reaction to litmus.

The remaining organs appeared to be normal on macroscopical examinations.

Bacteriological examinations were made and *B. coli* was isolated from various organs of the body.

Portions of kidney, liver, and stomach were fixed in 10 per cent. formalin and sections prepared. They were stained by haematoxylin and eosin and by Levaditi's silver impregnation method.

HISTOLOGICAL EXAMINATIONS

Kidneys.—The kidneys showed a chronic nephritis with what appeared to be a superimposed infection of an acute nature. The glomeruli were shrunken and lobulated, Bowman's capsule was thickened and there was appreciable fibrosis throughout the kidney tissue. Many tubules were much dilated and contained granular casts; others had been replaced by fibrous tissue. In addition to these chronic changes could be seen evidence of recent damage. The kidney tissue, especially the medulla, showed a marked congestion of the blood vessels with diapedesis and small haemorrhages. The tubules showed degenerative changes which varied from swelling of the lining cells to necrosis and desquamation. There were a few areas of cellular infiltration, mainly in the cortex; these cells were almost all of the plasma cell type.

In the sections stained by Levaditi's method no organisms resembling leptospirae could be found.

Liver.—The vessels, especially the central veins, and the sinusoids were congested. There had been some slight haemorrhage radiating out from the central vein. The normal liver structure was lost and the columns of liver cells and even the individual cells had been separated by blood and fluid. The hepatic cells were swollen and granular; some were binucleated, and showed mitotic figures. A few lobules showed areas of coagulative necrosis at the periphery of the lobule. Bile crystals were noted in many of the liver cells. No leptospirae were demonstrated in the Levaditi-stained sections.

Stomach.—Sections of the stomach wall revealed an acute haemorrhagic gastritis. The vessels were very congested; there had been haemorrhage into the mucous membrane together with exudation. The superficial mucosa was desquamating. Neutrophils predominated in the exudate.

The case was diagnosed, by Miss Mills, on clinical and serological grounds, as a case of *Leptospira canicola* infection.

Case No. 28

SUBJECT.—Black and white Collie dog, aged three years.

General bodily condition good. The skin and mucous membranes were deep yellow in colour.

THORACIC CAVITY.—The lungs were very congested and showed numerous haemorrhages of varying sizes. There was no consolidation but the apices showed emphysema. The bronchial lymph nodes showed oedema and haemorrhage. The pericardial sac contained excess serous fluid and the epicardium at the base of the heart was sprinkled with haemorrhages. The heart muscle was very flabby. The tissues in the chest were jaundiced.

ABDOMINAL CAVITY.—There was a gastritis and catarrhal enteritis. The liver was bile stained, fatty, and friable. It was congested and enlarged. There was no evidence of biliary obstruction. The spleen was also enlarged and congested.

The kidneys were swollen and tense, the capsule stripped easily. They were extensively jaundiced. Apart from bile staining the remaining viscera appeared to be normal on macroscopical examination. Urine was obtained from the bladder and was seen to contain albumin. Smears made from the centrifuged deposit and stained by Fontana's method did not reveal anything which could be definitely recognised as leptospirae.

Suspensions of liver and kidney tissues were inoculated into guinea-pigs. One guinea-pig died in three days from a suppurative peritonitis. *B. coli* was isolated in culture from this animal. The remaining guinea-pig survived and showed no evidence of leptospirosis.

HISTOLOGICAL EXAMINATIONS.—Owing to an oversight only Levaditi-stained sections were prepared from the tissues. Careful search of these sections revealed structures in the tubules of the kidney which may have been leptospirae in agglutinated masses. A definite diagnosis could not, however, be given.

This case, on serological and clinical grounds, was assumed to be due to *Leptospira icterohaemorrhagica*.

Case No. 10

SUBJECT.—Alsatian dog, aged twelve months.

General bodily condition was poor. There were no external abnormalities. The mouth and pharynx showed no gross changes.

THORACIC CAVITY.—The thoracic viscera were, macroscopically, normal.

ABDOMINAL CAVITY.—The stomach appeared to be normal as did the duodenum and the first portion of the ileum. The distal portion of the ileum and the colon showed varying degrees of an haemorrhagic enteritis. The bowel wall was thickened, the mucosa was very congested and, in parts, haemorrhagic. There was an abundance of bloody mucus in the lumen of the gut. The ileo-colic node was enlarged and congested. There were no parasites in the bowel.

The liver and spleen were normal on macroscopical examinations. There was no evidence of biliary obstruction.

The kidneys were enlarged and of a pale pink colour. The capsule stripped easily and the parenchyma appeared to be swollen and turgid. The cortex was more congested than the medulla. The ureters were normal. The bladder was, macroscopically, normal. It contained urine which was positive to the tests for albumin and on microscopical examination was seen to contain many granular casts. No leptospirae could be demonstrated in the centrifuged deposits.

HISTOLOGICAL EXAMINATIONS

Kidneys.—The kidneys showed extensive changes with areas of haemorrhage which were most marked in the cortex. There was

congestion of the vessels and diapedesis through the kidney substance. The glomeruli were shrunken and tufted. The lining epithelium of the tubules, especially the convoluted ones, showed degenerative changes ; a few contained hyaline casts. There was some interstitial fibrosis, but the most marked feature was the degree of cellular infiltration. Very large areas of the kidney showed this intense accumulation of cells. The cells comprised epithelioid cells and plasma cells in equal numbers with very few neutrophils.

Liver.—The liver sections showed congestion and haemorrhage. The individual hepatic cells were separated by red blood corpuscles and were swollen and granular. A few foci of round cells were noted ; these were mainly distributed around the bile ducts.

Bowel.—There was desquamation of the mucous membrane and separation and oedema of the submucous tissues. The exudate in the submucosa was very cellular, the neutrophil being the predominant cell.

Sections stained by Levaditi's method did not reveal any leptospirae.

This case was diagnosed serologically as being due to *Leptospirae icterohaemorrhagica.*

Case No. 18

SUBJECT.—Yellow Labrador dog, aged five years.

General bodily condition was good. Apart from a uraemic smell from the mouth there were no detectable external abnormalities.

THORACIC CAVITY.—The lungs were very congested and contained a few scattered haemorrhages which varied greatly in size. There was no consolidation. The bronchial lymph nodes were enlarged, congested and oedematous. The heart was soft and flabby. The pleura and pericardium were normal to the naked eye.

ABDOMINAL CAVITY.—There was an acute gastro-enteritis of a severe haemorrhagic nature. The spleen was congested and cyanotic. There was no evidence of biliary obstruction but the liver was darker than normal and engorged with blood.

The kidneys appeared to be larger than normal and were pale in colour. The capsule was easily stripped and the kidney tissue was swollen and turgid. There were a few petechial haemorrhages on the surface of the cortex (subcapsular). The boundary zone was congested. The remainder of the urogenital tract was normal. Urine was collected from the bladder and was found to contain albumin ; it was acid in reaction. No leptospirae were demonstrated in the urine sediment. They were searched for by dark ground illumination and by Fontana-stained smears.

A suspension of liver and kidney tissue, together with urine sediment, was inoculated into two white guinea-pigs. The usual methods were adopted. Both these animals survived and showed no malaise during the three weeks they were under observation.

HISTOLOGICAL EXAMINATIONS

Kidneys.—The kidneys showed congestion of all the vessels with a few areas of interstitial haemorrhage. Many glomeruli showed congestion and tufting ; they appeared to be excessively nucleated. The proximal convoluted tubules showed well-marked degenerative changes which varied in severity from cloudy swelling of the cells to necrosis and desquamation of the lining epithelium. In many cases the cells lining the tubules were so swollen as to occlude the lumen. Some tubules were dilated and contained hyaline and blood casts. There was an appreciable degree of intertubular infiltration with cells and, to a lesser extent, some periglomerular infiltration. These cellular areas were irregularly focal in distribution and consisted in the main of epithelioid type cells with a few lymphocytes and plasma cells. Neutrophils were very scanty. Some tubules appeared to have been replaced by these cellular areas. Sections stained by Levaditi's method did not show any leptospirae.

Bowel.—Sections of the bowel revealed evidence of an acute enteritis. There was separation of the submucous tissue and the mucous membrane showed marked congestion of the vessels and extensive diapedesis. The mucosa was heavily infiltrated with cells mainly neutrophilic in type but with a few lymphocytes. Some portions of the bowel showed loss of cellular structure mainly in the region of the mucous glands. There was some patchy necrosis and desquamation of the mucous membrane.

Liver.—The vessels were very congested and there was some separation of the hepatic cells. The individual liver cells were swollen and granular. No leptospirae were seen.

Lungs.—The lungs showed intense venous congestion (acute). Patches of haemorrhage were noted, the alveoli being filled with red blood corpuscles.

Heart.—Section of the heart muscle revealed cloudy swelling of the muscle fibres together with separation and fragmentation.

This case was diagnosed as a *Leptospira canicola* infection on serological grounds.

CLINICAL COMMUNICATIONS

Complete Prolapse of the Vagina in a Bitch

R. N. PHILLIPS, M.R.C.V.S., D.V.S.M.,
IPSWICH

Subject.—Crossbred Spaniel Terrier bitch ; aged two years.

History.—The bitch, which had never been mated, had been on heat for six weeks (the previous oestrus had persisted for two months). During the night, March 19th to 20th, the prolapse occurred.

Observations.—The animal was seen on the morning of March 20th. An oedematous mass, the size of a cricket ball, was protruding from the vulva.

Treatment.—Manual reduction was attempted but the mass remained immovable. The bitch was then anaesthetised with 10 grs.. nembutal intravenously and reduction again attempted but with no further success.

It was then decided to perform a laparotomy with a view to traction on the uterus to aid external manipulation.

Operation.—A midline incision, 1½ inch long, was made from the brim of the pelvis forwards. It was found that the bladder was retroverted and inside the prolapse. This was manipulated back to the normal position.

After prolonged efforts, combining traction on the uterus with manipulation of the mass, the prolapse was reduced but with extensive bruising of all tissues. The wound was closed with a deep layer of interrupted nylon sutures and a superficial layer of interrupted silk sutures. The whole was powdered with sulphonamide during suturing. Two silk sutures were placed across the vulva.

Prognosis.—Guarded, because of the extensive bruising.

After-Treatment.—Despite muzzling, bandages, elastoplast dressings, etc., it was impossible to prevent the bitch from interfering with the wound.

March 22nd. Half the skin sutures were missing and the wound discharging badly. Vulval sutures had also been removed by the patient.

March 25th. Remainder of the skin wound was now open. Two of the deep sutures were removed, presuming these to be the cause of the discharge.

March 26th. The other deep sutures were now removed.

March 30th. Bitch was very well and lively and went home, the wound was healing well.

April 2nd. The wound was practically closed.

April 9th. The wound was completely healed but there was considerable purulent discharge from the vagina. 7½ m. doses of extract ergot. liq. were given *t.i.d.*

April 20th. When last seen the patient was perfectly normal and the vaginal discharge had stopped completely. Temperature and appetite were normal throughout.

This case is reported for two reasons:

1. Paucity of information in literature on the condition.
2. Suppuration from deep nylon sutures—it is assumed that sterilisation was not adequate and that prolonged boiling for 20 minutes as recently recommended, is really essential.

* * * * *

Extraction of Difficult Molars in the Dog

VERNON L. MASTIN. M.R.C.V.S.
CHISLEHURST

Division of the tooth by means of bone forceps has been practised for a long time but the tendency for the tooth to splinter renders this method unsatisfactory.

It was decided to attempt to divide the tooth by means of an ordinary 5-inch jewellers' piercing saw. Since frames for these are at least four inches deep a frame having a depth of ½ inch was made from 3/10 inch mild steel. Details of the frame are shown in the sketch.

5" JEWELLERS' PIERCING SAW

The method of using this saw is as follows:—

The fine piercing saw is placed in position and the end of the frame pressed against the table in order to spring it slightly. Whilst held in this position the screws are tightened onto the blade. The saw is now ready for use and the blade is held taut by the frame springing back.

These blades easily divide the tooth which can then be extracted in two parts without, as a rule, breaking the fangs.

This saw has now been used on a large number of cases with considerable success.

ABSTRACTS

[The Prevention and Treatment of Shock by Intravenous Gelatin. Allam, M. W. (1947.) *J. Amer. vet. med. Ass.* **61**. 487-490. (1 fig., 1 table, 18 refs.)]

A six per cent. gelatin solution in 0·85 per cent. saline is used as a substitute for plasma. Animal plasma is not easily obtained and is preserved with difficulty. Bovine plasma is not free from reaction when given to other species. Of many substances and preparations used to counteract shock in animals only human serum albumin and gelatin have been proved safe and effective. That used by the author was specially prepared by hydrolising alkali-treated bovine long bone collagen and sterilised by autoclaving at 15 lb. pressure for 20 minutes.

The dosage is 4·5 to 13·6 c.c. per lb. body weight. Increased dosage of gelatin causes no toxic reaction and rapid infusion (40 c.c. per minute) produces no ill effect. In experimental cases of shock which were treated the decreased plasma volume and blood pressure quickly returned to normal. As the gelatin gradually disappeared from the circulation it was replaced by plasma protein at the same rate. Fifty per cent. was excreted in the first 24 hours, the remainder disappearing from the blood stream within three to five days. The solution is administered by gravity in an open burette or from an inverted bottle carrying the intravenous tube and needle and an air vent with cotton wool filter. At ordinary room temperature a six per cent. solution is in the form of a gel, having therefore to be warmed to melting point before use. Once liquid it remains so for some hours, giving ample time for administration.

Ninety-five cases have been treated, the subjects of 91 being dogs. The references indicate that many experimental and medical workers have found that gelatin compares favourably with plasma as a blood substitute.

C. F.

* * * * *

[De Formatione Ovi et Pulli. Harris, H. A. (1948.) *Brit. Med. J.* March 27th.]

The title of this article is taken from the classic work of Hieronymus Fabricius of Aquapendente, who held the chair of Anatomy at Padua at the end of the 16th and beginning of the 17th centuries. This treatise has been recently (1942) translated by Howard B. Adelmann, Professor of Histology and Embryology in Cornell University, and its accuracy as a piece of observational research may be judged by the fact that even at the present time there is little to add to Fabricius' description of the life history of the egg.

A renewed interest in this subject has been recently evoked by the work of Mr. J. R. G. Bradfield of the Department of Zoology at Cambridge. With the assistance of the radiographer, Mr. J. A. F. Fozzard, the development of the egg as we know it has been traced from just after ovulation until expulsion. Briefly the facts are as follows:—

An approximate period of 26 hours elapses between the laying of successive eggs. This is divisible into half an hour between laying one egg and the next ovulation, half an hour to pass through the infundibulum of the oviduct, three hours in the magnum, where albumen is secreted, one hour in the isthmus, which secretes the shell membrane, and 20½ hours in the uterus where the shell is laid down.

Radiographically the first trace of calcium deposition is at six and a half hours after laying the last egg. At 12 hours the outline of the shell is distinct, at 23½ hours the pointed end of the egg is still in advance, but between the 24th and 25th hours, the egg rotates on its vertical short axis in a horizontal plane, so that the blunt end presents itself at the cloaca.

It has been established that mass peristalsis or movement of the uterus similar to that of the intestine in propelling a bolus, does not take place. What does happen is that the terminal part of the uterus with the contained egg prolapses through the cloaca. The uterus is then withdrawn, leaving the egg outside.

The suggestion is put forward that the egg rotates in the oviduct because the hemispherical blunt end has a surface area which conforms to the mucous membrane of the dilated terminal portion of the uterus. When the problem of the blunt end of the egg in advance is studied in terms of surface area and dynamics, it is seen that this method of presentation does not dispose towards rupture of the egg or of the uterus.

J. G. C.

NOTES AND NEWS

Diary of Events

June 7th-8th.—R.C.V.S. D.V.S.M. Written Examination.
June 8th.—Scientific meeting of the Zoological Society of London, Regent's Park, N.W., 5 p.m.
June 9th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.
June 10th.—Annual Meeting of the Lincolnshire and District Division, N.V.M.A., at Peterborough (Grand Hotel), 2.15 p.m.
June 10th.—R.A.V.C. Golfing Society Meeting, North Hants G.C., Fleet. (See Notice).
June 10th.—Meeting of the West of Scotland Division, N.V.M.A., Clinical Club, Glasgow Veterinary College, 7.30 p.m.
June 11th.—Summer Meeting of the South-Eastern Division, N.V.M.A., at Folkestone (The Leas Cliff Hall), 2.30 p.m.
June 11th.—R.A.V.C. Annual Dinner, Grosvenor House, London, W.
June 16th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at Perth (Station Hotel), 2.30 p.m.
June 16th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, at Cambridge. (*See Notice.*)
June 17th.—Central Veterinary Society's visit to the Compton Field Station of the Agricultural Research Council.
June 24th-25th.—R.C.V.S. Membership Written Examinations.
June 30th.—July 2nd.—Meetings of Council and Committees, N.V.M.A., in the Royal (Dick) Veterinary College, Edinburgh.

Sept. 8th to 15th (inclusive).—N.V.M.A. Congress at Southport.

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R.C.V.S. Council Election Result

The following result of the ballot of members taken for the election of eight members of Council was declared at the annual general meeting of the Royal College of Veterinary Surgeons, held at 10, Red Lion Square, London, W.C.1, on Tuesday last:—

Name	*Votes*
L. P. Pugh	826
A. B. Mattinson	791
L. G. Anderson	751
J. F. D. Tutt	722
T. J. Bosworth, W. K. Townson	707
J. D. Peele	632
J. W. Emslie	584

(The above-named were declared elected.)

Tom Hare	578
J. Carmichael	549
H. Burrow	430

Representative of Eire

It was also announced that Professor W. Kearney, M.Sc., M.R.C.V.S., was returned as General Elected Member of Council, representing Eire.

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PERSONAL

Births.—Harries.—On May 16th, 1948, at Belleigh House, Fakenham, Norfolk, to Nan (née Twiddy) wife of D. C. Harries, M.R.C.V.S.—a daughter, Heather Jane (sister for Anne).

Garner—On May 27th, 1948, at Norwich, to Daphne, wife of R. J. Garner, Colonial Veterinary Service—a daughter.

Marriage.—LEWIS—WICKHAM.—On March 30th, 1948, at St. Nicholas's Church, Rochester, Sheila Joyce Wickham to Derek George Lewis, M.R.C.V.S., of 99, High Street, Rochester. The best man was S. V. Boyden, B.SC., M.R.C.V.S.

Will.—Mr. Alexander Pottie, M.R.C.V.S., of The Gables, Shandon, at one time a very well known veterinary surgeon in Paisley, Renfrewshire, who died on November 5th, 1947, left £43,576.

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ROYAL COLLEGE OF VETERINARY SURGEONS

Animal Management Examination

LIST OF SUCCESSFUL CANDIDATES

DUBLIN:

Barnes, M.
Blake, J. W. F.
Casey, P. J. P.
Cox, M. J. A.
Crowe, J. A.
Davies, S. F. M. (credit)
Deevy, W. E.
Dowling, V. A.
Doyle, A.
Duignan, E. J.
Dunne, P. J.
Forde, D. M.
Hanly, S.
Johnson, D. P.
Keating, J. P. (credit)
McClintock, S. J.
McGarry, W. V.
Maher, M. P.
Mehigan, C.
O'Connor, Michael
O'Connor, P. J. (credit)
O'Reilly, J. P.
O'Reilly, M. J.
O'Rourke, W. J.
Purcell, P. (credit)
Rogers, P. S.
Ruane, E. J.
Sheehan, D. P.
Sheehan, G. T. M.
Schorman, N. S. (credit)
Tyrrell, K. M.

(*Concluded*)

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Veterinary Pharmacology, Materia Medica and Pharmacy Examination*

LIST OF SUCCESSFUL CANDIDATES

LONDON:

Bateson, W. B.
Beaumont, J. E.
Beckett, R. L. (credit)
Blampied, N. le Q.
Bongard, A. L.
Bradley, G. E.
Burman, Peter
Corder, John (credit)
Croft, Miss P. G.
Davies, D. C. (credit)
Davies, J. I.
de Gruchy, P. H.
Dwane, J. B.
Fumpston, W. A.
Garland, J. E.
Gibson, Miss M. A.
Goodwin, R. F. W. (credit)
Hall, L. W.
Hannaford, P. J. (credit)
Harley, P. J.
Harthoorn, A. M.
Heath, J. S.
Ikin, Peter (credit)
Jack, E. J.
Jackson, B. N.
Johnson, Miss A. I.
Jones, D. G. H.
Jones, I. I. (credit)
Jones, J. E. T.
Kirkby, W. W.
Mercer, P. H.
Paine, G. D.
Restall, Victor
Simpson-White, J. N.
Smalley, P. R.
Smith, A. C.
Threlkeld, J. M.
Wadsworth, Frank
Wheeler, Miss E. C.
Williams, B. M.

DUBLIN:

Bourke, P. J.
Clarke, R. R.
Cox, M. J. A.
Duignan, E. J.
Fagan, J. A.
Harney, J.
Kealy, J. K.
Kilmartin, V. J.
Lunny, Kevin (credit)
McAlinden, J. H.
McBride, J. J. (credit)
McDougald, W. L.
Maher, M. P.
O'Connor, F. M.
O'Connor, P. J. (credit)
O'Donnabhain, S. S.
O'Hart, P.
O'Reilly, J. P.
O'Reilly, M. J.
Ronan, Wm.

* Revised syllabus.

(*Concluded*)

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THE ROYAL SANITARY INSTITUTE

Annual Congress at Harrogate

The veterinary hygiene section of the congress met on May 27th and 28th, under the presidency of Mr. H. B. Allen, Superintending Veterinary Inspector of the Animal Health Division of the Ministry of Agriculture and Fisheries.

After the President's inspiring address, which was well received, Mr. W. Tweed, Divisional Inspector, introduced a paper on "The Modern Abattoir and Meat Inspection," the discussion on which was opened by Mr. D. Johnston, Divisional Inspector and continued by veterinary surgeons, doctors, sanitary inspectors and representatives of local authorities. The company included representatives of the Ministry of Health and Ministry of Food, who also took part in the discussion which covered the whole field regarding the hygienic slaughtering of animals, dressing of carcases and handling and transport of meat.

On the second day, Mr. J. N. Ritchie, Deputy Chief Veterinary Officer of the Ministry of Agriculture, introduced his paper on "Bovine Tuberculosis." The paper treated the subject as related to public health and the discussion, opened by Mr. W. R. McKinna of Huddersfield and well maintained by the considerable number of veterinary surgeons present, continued in that strain and at the conclusion it was agreed that this had been one of the most successful meetings of the veterinary hygiene section for some years.

The President and readers of papers were accorded votes of thanks for their services and the veterinary surgeons present were kindly entertained to lunch by the President, after which the view was expressed and endorsed that it is important for the profession to maintain its claim to participation in the work of public health by attending in good numbers the future meetings of the veterinary hygiene section.

* * * * *

"DANGER TO SHECHITA"

In its issue of May 21st, *The Jewish Chronicle*, under the above heading, warns its readers that there are indications of what may develop into an onslaught on one of "the basic requirements of the Jewish faith—the practice of Shechita." Reference is then made to "an attack on the Jewish method of slaughter by a peer in the House of Lords," to the insertion in the Press by the Chief Secretary of the R.S.P.C.A. of a letter announcing the intention of the Society to work for an amendment (which would affect Shechita) to the Slaughter of Animals Act, 1933 (a clause of which gives special exemption on religious grounds to Jews and Moslems from the general requirement to use certain stunning methods), and finally, to "a campaign against Shechita now being carried on by correspondence in a veterinary journal."

A denial of any real necessity to refute allegations of cruelty levelled against Shechita "more often than not by sentimentalists lacking that knowledge of physiology that above all will enable them to pronounce on the degree and duration of suffering of slaughtered animals" precedes the following passages:—

"*A Case to Answer*"*

"There is no doubt that Shechita, properly carried out, can stand comparison with any other method of slaughter in the world, whether considered from the point of view of humanitarianism or hygiene. But it is, of course, the essence of the matter that it should be properly carried out; and in this respect it is possible that the Shechita Board—and hence the community as a whole—may have a case to answer. The Jewish method of slaughter is, we believe, unexceptionable; the methods of casting the animal before slaughter have perhaps not been so unassailable. Casting pens that eliminate all possibility of damage or pain to the beasts have been devised; but they are not yet universally in use in Jewish slaughterhouses. Why not? This is one of the questions in regard to which the community is entitled to ask the Shechita Board for a clear and unequivocal answer. It may be that war-time and post-war restrictions have prevented the manufacture of a sufficient number, but the matter should receive further attention. Some time ago a committee was appointed to enquire into the administration of the Shechita Board, and the committee, in a "private and confidential" report, recommended that certain changes should be made. These recommendations have not yet been put into practice, and the report has not been published, although one would have supposed that in a matter so clearly affecting the vital interests of Anglo-Jewry as a whole the public was entitled to the fullest information. That there are in this country forces actively inimical to Jewry and Judaism is—unhappily—a matter of common knowledge; and it is, to put it at its lowest, poor tactics to provide powder and shot for our enemies by allowing a case to go by default. Shechita in England is, or very soon may be, in danger. If we are to be able successfully to defend this ancient heritage of our faith, the Shechita Board and the Shochetim must put their house in order. The least suspicion of inefficiency or of slipshod methods in our slaughterhouses may have incalculable consequences on the religious life and even the very existence as a community of Anglo-Jewry."

* Our heading.—EDITOR, *The Veterinary Record*.

B.M.A. AND THE NATIONAL HEALTH SERVICE

Profession Recommended to Co-operate

The representative body of the British Medical Association, after an all-day discussion held in London on Friday of last week, agreed, by a large majority, to recommend the profession to co-operate in the National Health Service on the understanding that Mr. Bevan, Minister of Health, would continue negotiations on outstanding matters.

It was also decided that if the proposed Amending Act proved unsatisfactory to the representative body, members serving under the Act should resign or take other steps considered necessary by the Association.

Outstanding differences include terms and conditions for consultants and specialists, general practitioners, public health officers and others. The resolution for co-operation, put forward by the B.M.A. Council, also called attention to an insufficiency of safeguards for professional freedom and the misgivings of a substantial number of doctors.

* * * * *

Annual Scientific Meeting

The first annual scientific meeting of the British Medical Association since the war will be held at Cambridge during June 25th to July 2nd, under the presidency of Sir Lionel Whitby, regius professor of physic in the University. Among the topics of particular scientific interest announced for discussion are: recent advances in knowledge of the *Rh* factor in blood; plasma and blood derivatives in the treatment of burns; human relations in industry; prophylaxis of virus infections; radioactive isotope therapy; aviation medicine; nutrition; antihistamine substances.

* * * * *

EXPANSION OF MILK MARKETING BOARD'S ARTIFICIAL INSEMINATION SCHEME FOR CATTLE

Great expansion of the Milk Marketing Board's artificial insemination scheme for cattle is shown in the report for the year ended March 31st last, issued by the Board on Monday last.

In the 12 months under review members using the Board's centres increased from 4,420 to 12,766, and the number of cows inseminated from 25,500 to more than 90,000. The number of bulls at the Board's centres increased from 69 to 182 (the figure has now gone up to 212). Of the total inseminations, 36,850 were from British Friesian bulls and 30,166 from Dairy Shorthorn.

By 1953 the Board expects to provide A.I. services for 40 per cent. of the total cows in the country. This will mean increasing the number of main A.I. centres from the present figure of 12 to 30.

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Hunts.—Herne Road, St Mary's, Ramsey, Huntingdon (May 24th).

Staffs.—Walton Field Farm, Moreton, Gnosall, Staffs (May 24th).

* * * * *

Weekly Wisdom

". . . *Reproduction, from one point of view, may be said to be the first duty of man and woman. They must provide children that humanity may continue to exist and human life go on. In most animals existence and reproduction constitute almost the whole of life. This is true of all animals except man; and it is in general true of man except of a few individuals and these only in the last four thousand years of his life. But existence and reproduction remain to-day, as they have always been, the two fundamental duties of the great mass of mankind.* . . ."—Mathews, A. P. (1939.) Physiological Chemistry, p. 1060, 6th edn. London: Baillière, Tindall & Cox.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible.

BLOAT IN CATTLE

Sir,—A considerable amount of thought is now being given to the cause of bloat (hoven) in cattle. There is not a great deal of definite information on the subject. The incidence seems to be quite high in certain areas in the country. The problem should be investigated by scientific workers in different fields. While the physiology and pathology demand the services of veterinary workers, there are other aspects which can be dealt with by workers in other fields.

The Agricultural Improvement Council are anxious to see some work carried out and it has been agreed that the veterinary profession and members of the National Agricultural Advisory Service should be asked to take part in a survey throughout the country. The purpose of the survey, in the first instance, is to obtain information on the incidence of the condition and to study the field conditions under which it occurs. The plan, briefly, is as follows: we want to hear of the occurrence of bloat in cattle. Veterinary surgeons have this information for they are called by farmers to the affected animals. We would be very glad if veterinary surgeons would contact the Veterinary Investigation Officer in their area and tell him of any cases they meet.

The V.I.O. will then set in motion the further investigation which will include visits by Officers of the N.A.A.S. to the farm when a study will be made of the pastures and in some instances, of the soil. It will be necessary, I think, that the veterinary surgeon obtains the permission of the farmer concerned before he reports the occurrence to the V.I.O. because of the subsequent visits of the various investigating personnel to the farm. We are anxious that the survey should be country-wide in order to obtain as much general information as possible: detailed examinations of pastures, soils, etc., will be confined to certain areas, those suggested being Southern England and part of the Midlands. The V.I.O. will enter largely into these investigations and will visit the veterinary surgeons who report cases in order to obtain as much information as possible from the veterinary angle.

Such a scheme should assist greatly in a general appreciation of the position and should lead to better knowledge of the conditions under which bloat occurs: it will also open the way for further research work on the essential causes of the disease from which we might expect to elaborate methods of control.

We will be very grateful if the N.V.M.A. will collaborate in the survey by bringing the matter to the notice of veterinary surgeons throughout the country.

Yours faithfully,

T. Dalling.

Ministry of Agriculture and Fisheries,
Veterinary Laboratory,
New Haw, Weybridge.
May 24th, 1948.

[Such collaboration as is suggested by our correspondent is very much in line with the proposals made by the N.V.M.A. Agricultural Programme Committee, and the Association hopes that veterinary surgeons throughout the country will do their very best to co-operate.—Editor.]

* * * * *

WARBLE INFESTATION OF HORSES

Sir,—I should like to record the following case of warble infestation of horses.

In January, 1947, I was asked to see a case of very acute lameness in an aged gelding used for light draught and occasional riding. There was acute pain in the off hind, but even after careful examination, no lesion whatever could be located in any part of the foot or leg. Complete recovery followed in a few days after rest.

Within three or four weeks the horse again went lame, this time with greater severity than before. He would in fact stand only on three legs, occasionally holding the affected limb in a position of extreme flexion, and obviously suffering from acute spasms of pain. A consultation with a very experienced horse practitioner produced no more than a tentative diagnosis of arthritis of the hip joint, with a poor prognosis and strong recommendation to destroy the horse. At the request of the owner, however, the horse was slung, and after six weeks in slings went perfectly sound. No lesion was at any time detectable.

A few weeks later, however, a large warble larva emerged from the region of the hip. I can only infer that in the course of migration the larva encountered a nerve trunk, causing a painful neuritis. The horse has not been lame from that day onwards and shows no lesion which could be associated with such severe lameness.

I should be interested to hear of any similar cases in the experience of your readers.

Yours faithfully,

F. C. Alexander.

"Elmcroft,"
Church Street,
Cannock, Staffs.
May 23rd, 1948.

USE OF A PAPER CLIP IN ARRESTING HAEMORRHAGE AFTER CASTRATION

Sir,—Recently I castrated a two-year-old colt in the standing position with the emasculator. There was practically no haemorrhage after the operation.

The same evening I received a call from the owner to say that the colt was bleeding very badly. When I arrived the animal was looking very dejected, breathing heavily and staggered when walking. He was bleeding very profusely from the near side wound and the ground nearby was covered with blood.

My first intention was to plug the scrotal sac with cotton wool soaked in acriflavine and suture the lips of the wound, but on attempting to pierce the skin with the needle the colt kept lifting his leg, which made the procedure very difficult.

It was dark by this time and with only a torch to aid me, the idea of the use of a clip occurred to me. The owner produced a tightly sprung paper clip which I clamped over the lips of the wound, the flow of blood being arrested immediately.

On my instructions the clip was removed the following evening by the owner and when I saw the colt two hours later, the plugs and a large amount of clotted blood had fallen from the wound. The colt was grazing and looking very bright. There was no further haemorrhage.

In view of the very difficult and almost absurd procedures for arresting haemorrhage of this description, described in some textbooks, I claim that this very simple technique has everything in its favour.

Yours faithfully,

50, Church Street, W. W. Black.
Burnley.
May 22nd, 1948.

* * * * *

"ACUTE INTERSTITIAL EMPHYSEMA IN BOVINES"

Sir,—My attention has been directed to an important article in your issue of March 20th, 1948, entitled "Acute Interstitial Emphysema in Bovines." The authors, Messrs. Begg and Whiteford, described with admirable succinctness a disease which appears identical with the condition long known in Herefordshire as fog fever.

We began to form a herd of pedigree Hereford cattle about 1936 and for several years have lost nearly 10 per cent. of adult cows, mainly in August and September, from this disease.

The onset is sudden with progressive respiratory distress, leading in fatal cases to death in about four days. There is no pyrexia. *Post-mortem* appearances are set out in the article in your journal.

In 1947, in consequence of the severe loss, we sought help in some investigations which were carried out by Mr. Menzies and Mr. Osborne of the Agricultural Veterinary Investigation Centre, Dr. Fraser, Hon. Pathologist of Bristol Royal Infirmary and Mr. Whittle, City Analyst.

Mr. Perrett treated the animals and gave adrenalin. The results of the investigations were almost negative. Blood counts and cultures showed nothing abnormal. The liver gave no sign of alkaloid poisoning. The affected areas in the lung revealed an alveolitis with exudates. It is noteworthy that a Guernsey herd living under similar conditions has not been affected.

Yours faithfully,

Northwoods, Joseph Cates,
Winterbourne, Director, Northwoods, Ltd.
Bristol.

* * * * *

THE VETERINARY SURGEONS BILL

Sir,—In view of the crop of reactionary letters appearing in to-day's edition of the *Record*, I feel that it is desirable to present the other point of view on the Bill and particularly on the much discussed question of title for unqualified persons.

Criticism in a journal such as ours should surely be constructive, even if in retrospect. Letters such as these serve no useful purpose and merely lead to embitterment. It would appear that the writers must be so busy in preparing their criticism that they are unable to find time for an intelligent perusal of the admittedly copious publications recently issued on the subject of the Bill, notably the Statement of Progress by the President, R.C.V.S., and the Committee Stage in the Lords.

The position as regards title is admirably explained in the latter by the Earl of Huntingdon (*ibid.* Vol. 60, p. 235). The Council, R.C.V.S., have made it clear that they do not relish giving the title "vet" to the unqualified persons, no qualified veterinary surgeon does; and the Council have done everything in their power short of preventing the passage of the Bill to prevent this concession; but a compromise must be reached, and no alternative which would be acceptable to the Government has yet been suggested. The Government are bound by one of the oldest of our legal customs, that of establishment of a principle by precedent, which applies equally in legislation as it does in law. An examination of the question from this aspect shows that the title "Veterinary Practitioner" is the only one suitable. I would enjoin those members dissenting on this point to study the question from all sides and not merely from their own narrow viewpoint, when they will realise that their ungracious remarks should be directed not at our "shilly-shallying, weak-kneed" Councillors, but at the foundation stone of the British legal system, which is so well bedded down that it will remain unmoved by such protests.

We are presented with a measure which prevents a large proportion of unqualified persons from continuing their activities (*i.e.*, those who do not fulfil the requirements of Sect. 6 of the Bill); which prevents any unqualified person from commencing activities; and which makes provision for the staffing of clinics ultimately by qualified persons only. The provisions of Sect. 6 are more favourable to us than any other similar section in a Bill to restrict unqualified practice. It is only equitable to permit persons who meet these provisions to continue their activities under the control of the R.C.V.S. and subject to the same discipline as ourselves.

To give these people the right to call themselves "vets" may be a nasty pill to swallow, but the taste is more than disguised by the liberal amount of sugar coating. And with all the discussion, in actual practice it will make little difference, for the public will always refer to any person treating a sick animal as a "vet," whatever his qualifications or lack thereof.

I offer thanks to those people who have laboured so long to bring this excellent measure before Parliament.

Yours faithfully,

252, Whitchurch Lane, P. Livingston Builder.
Edgware, Middlesex.
May 29th, 1948.

. . . . . .

Sir,—Our failure to prevent the granting of the title "Veterinary Practitioner" to the class of people that will be registered under the new Veterinary Surgeons Bill undoubtedly means that the public will be unable to distinguish between these and ourselves.

Previously, however, the average person, especially the town dog-owner, was unable to distinguish between a veterinary surgeon and anybody else who was willing to treat animals. I cannot therefore believe that the absorption of a few hundred (at most) of the least objectionable quacks will harm either ourselves or the public as much as is implied.

Against this concession must be set the very real advantage that in future no other unqualified person may officially make a living by treating animals. Nothing will stop a certain type of person from consulting "nice" quacks in deliberate preference to qualified people. But just as to-day nobody who goes to a "herbalist" mistakes him for a doctor, so in the next generation nobody will take their animals to whatever witch-doctors then exist without knowing that they are not getting orthodox veterinary treatment.

The rest of the Bill provides for a possible expansion of our profession. In so far as we are parasites on the animal-owning public we are afraid. In so far as we are the useful but overworked servants of this public we are relieved and encouraged.

Yours faithfully,

11, Domonic Drive, Connie M. Ford.
New Eltham, London, S.E.9.
May 30th, 1948.

. . . . . .

Sir,—It appears to me that once this Bill becomes law and a large number of quacks are allowed to use the word "veterinary" we will find that far from reaping advantages, we have sold our birthright for an inedible mess of potage.

Is this not perhaps a good time to plead once more that members of the Royal College be allowed the courtesy title of doctor. This would give the great British public a chance of distinguishing between Dr. Blank, M.R.C.V.S., veterinary surgeon and Mr. Quack (no letters) veterinary practitioner.

Yours faithfully,

8, Abingdon Villas, Leonard R. Geffen.
Kensington, W.8.
May 30th, 1948.

Sir,—In considering the new Bill let us remember the younger members of the profession, especially those who have recently started up in practice.

Such a person, until he has made his name, has only a brass-plate to distinguish him from the local quack; immediately the quack puts up his plate the public will see no difference between the two.

The lead being given by the Council was very heartening but the recent *volte-face* has destroyed all faith in our "representatives." This matter of registering the unqualified has been regarded as unimportant *but surely its importance varies according to the circumstances of the individual veterinary surgeon* and to the younger man it is indeed a bitter pill to swallow. In view of the harm that will be done to our honourable calling by these interlopers would it not be better to delay the Bill until further negotiations enable this point to be settled to *our* satisfaction?

Should the Government prove adamant and insist upon the unqualified being called "Veterinary Practitioners," would any objection be raised to Mr. Jack Smith, M.R.C.V.S., styling himself "Veterinary Surgeon and Practitioner?" The proposed classification of veterinary surgeons and unqualified practitioners will mislead the public who will tend to call in the "Veterinary Practitioner" for everyday ills in preference to the veterinary surgeon. The use of the double title would give a more comprehensive definition of the qualified man's professional activities.

Yours faithfully,

42, North Bar, G. Mason.
Banbury, Oxon.
May 24th, 1948.

. . . . . .

Sir,—The proposed Veterinary Surgeons Bill is not only totalitarian, it is a direct insult to our profession.

Not only is our title to be given to quacks, but we are asked to submit professionally to a governing body containing persons who may not be members of our profession.

The time has come for a referendum to determine the wishes of the profession with regard to this Bill.

Yours faithfully,

2, Bridge Terrace, Berwick-on-Tweed. John Harmar.
May 30th, 1948.

. . . . . .

Sir,—It seems inevitable that in spite of the disapproval of the majority of the profession, the title "Veterinary Practitioner" is to be given to quacks.

A large proportion of these people will be using drugs which can be dangerous if used in anything but the correct dose, so that it is possible for new strains of sulphonamide- or penicillin-resistant bacteria to arise.

The profession and the public have no means of knowing who are competent among the quacks and who are not. I suggest that all persons wishing to be recognised as veterinary practitioners should submit to an examination set, or at least supervised, by the Examination Committee, R.C.V.S.

Any person failing this examination, or refusing to take it, would be allowed to call himself "Unqualified Veterinary Practitioner" if he so wished, and would not be allowed access to any dangerous drugs.

Those who passed the examination would at least be competent enough to prevent the word "veterinary" being disgraced.

A refusal on the part of the Animal Societies to accept this examination would, to my mind, be an admission of incompetence, while the Government, I am sure, should welcome this extra "protection of the public interest."

Yours faithfully,

Orchard House, Robert Potter.
St. John's Road, Bexhill.
May 31st, 1948.

. . . . . .

Sir,—I found it very refreshing to read so many letters in this week's *Record*. I wish that we could have as many each week, thus voicing the views of the profession and less of the highly technical articles running into many wasted pages. I heartily agree with James McCunn, and many colleagues to whom I have talked also have that feeling of sadness and shame. To "give the devil his due"—I am sure that the unqualified people never hoped for such a title as "Veterinary Practitioner."

Most certainly have a referendum—if it delays the Bill it will not matter, it is a bad one, and it will end the good days of the profession. Mr. Kinghorn says that the Bill "stinks anyhow." I congratulate him on having this phrase passed. On the last occasion that I wrote to the *Record* my letter was cut and altered to a shadow of its former self.

The letter of James Macqueen reads much like the writing of his late respected father. I sympathise with him *re* not being allowed to insert at least one advertisement when starting in practice. Years ago I inserted two small intimations in the local Press, but that was in the days of more individual freedom. In the multiplicity of new rules and regulations, striking at our liberty, it is difficult to keep up to date.

Yours faithfully,

"Longwood," Harold C. Driver.
Holders Hill Road,
Hendon, N.W.4.
June 1st, 1948.

. . . . . .

Sir,—Does not the title "Doctor of Veterinary Medicine" more become the status and activities of the present-day veterinary surgeon?

To the public the word "Doctor" signifies a highly qualified, reliable person, held in high esteem by reason of the possession of that title.

Surely, therefore, this title is applicable to members of the veterinary profession? The fact that it is accorded in some countries overseas may act as an example, but it would be for the profession itself to justify its use here.

The obvious time for this change is when the degrees of the universities teaching veterinary medicine are substituted for the diploma of the R.C.V.S.

Some will disagree with these proposals on the grounds that they aim too high; others will ask "What is wrong with the title 'veterinary surgeon?'"

The answer to the former is that more comparative medicine should be included in our curriculum and the standards of our teaching raised.

To the latter I would point out that this change would at least put an end to the controversy over "Veterinary Practitioners" and "quacks." They could all be veterinary practitioners, but they would not be doctors.

And why should we accept the principle that "What was good enough for grandfer is good enough for you"?

Yours faithfully,

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Streatley House,
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May 30th, 1948.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
Apl. 16th to 30th, 1948	5	—	6	—	2	2
Corresponding period in—						
1947	7	—	77	—	3	—
1946	4	2	—	—	—	26
1945	6	10	—	1	4	44
Jan. 1st to Apl. 30th, '48	40	—	161	1	23	13
Corresponding period in—						
1947	27	83	138	1	18	14
1946	41	22	—	4	34	218
1945	43	73	—	5	37	375

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at April 30th, 1948, was as follows:—

England	Wales	Scotland	Total (Great Britain)
10,761	11,649	10,395	32,805

FIG. 1
Fracture of the astragalus of a hunter. Upper arrow shows where the piece of bone was broken off.

FIG. 2
Fracture of the navicular bone shown at A and B. Arrow C points to a spur on the navicular bone.

FIG. 3
Fracture of the unciform bone ; antero-posterior aspect.

FIG. 4
Lateral view of horse's knee showing fractured unciform.

FIG. 5
Multiple exostoses on the suffraginis resulting from

FIG. 6
Lateral view of same case as in Fig. 5. Lower arrow